

Message

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**From:** Nwosu, Bernard [Ben.Nwosu@WestonSolutions.com]  
**Sent:** 3/17/2016 1:09:47 PM  
**To:** Nguyen, Lyndsey [Nguyen.Lyndsey@epa.gov]; Gaughan, Daniel [Gaughan.Daniel@epa.gov]  
**CC:** Benton, Tim [Tim.Benton@WestonSolutions.com]  
**Subject:** RE: Proposed Sampling and CRU Action Levels

Goo morning All.

In addition to isotopic thorium (thorium-228, thorium-230 and thorium-232), isotopic uranium (uranium-233/234, uranium-235/236 and uranium-238), the list of gamma isotopes should include:

K-40, Tl-208, Bi-212, Bi-214, Pb-212, Pb-214, Ra-226, Ra-228, Th-234, U-235, Pb-210, Bi-210

**Ben Nwosu**  
**Weston Solutions, Inc.**  
RST3/ED2

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**From:** Nguyen, Lyndsey [mailto:Nguyen.Lyndsey@epa.gov]  
**Sent:** Wednesday, March 16, 2016 4:54 PM  
**To:** Gaughan, Daniel  
**Cc:** Nwosu, Bernard ; Benton, Tim  
**Subject:** RE: Proposed Sampling and CRU Action Levels

Also, Ben, if there are any radionuclides missing please let me know. I went by the list for the maximum concentrations that you sent me a while back and verified that all of the radionuclides on that list matched Table 8A with the analysis results.

Lyndsey  
Lyndsey Nguyen  
Environmental Response Team-Las Vegas  
Phone: 702.784.8018  
Cell: 702-373-3756  
Email: [Nguyen.Lyndsey@EPA.gov](mailto:Nguyen.Lyndsey@EPA.gov)

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**From:** Gaughan, Daniel  
**Sent:** Wednesday, March 16, 2016 4:48 PM  
**To:** Nguyen, Lyndsey <[Nguyen.Lyndsey@epa.gov](mailto:Nguyen.Lyndsey@epa.gov)>  
**Cc:** Nwosu, Bernard <[Ben.Nwosu@WestonSolutions.com](mailto:Ben.Nwosu@WestonSolutions.com)>; Benton, Tim <[Tim.Benton@WestonSolutions.com](mailto:Tim.Benton@WestonSolutions.com)>  
**Subject:** Re: Proposed Sampling and CRU Action Levels

Are all of the radionuclides listed by Lyndsey included in our proposed analyses by Ben?

Dan Gaughan  
917-613-2153  
[gaughan.daniel@epa.gov](mailto:gaughan.daniel@epa.gov)

On Mar 16, 2016, at 4:36 PM, Nguyen, Lyndsey <[Nguyen.Lyndsey@epa.gov](mailto:Nguyen.Lyndsey@epa.gov)> wrote:

Attached is an updated proposed sampling description with the depths for each sampling location (4ft vs. 8ft instead of 4ft vs. >4ft).

Below are the PRGs for each specific radionuclides of interest for CRU. The ones asterisked (\*) indicate that these radionuclides are included in the parent radionuclides PRG due to secular equilibrium. To determine if the PRGs were exceeded for the progenies already incorporated into the parent radionuclide PRG, I recalculated a more conservative number for the progenies listed in our data so there was a distinct number for each radionuclide listed. The following list are the action limits for each radionuclide:

Isotope	PRG (pCi/g)
Th-228	13300
Th-230	2060
Ra-228*	16.1
Th-232+D	5.11
U-233/234	3260
U-235/236	37.7
U-238	3650
Ra-226+D	2.52
Ac-228*	128000
Bi-212+D	6440000
Bi-214*	1310000
Cs-137	11.2
K-40	26.7
Pb-210	418
Pb-212	657000
Pb-214*	7330000
Tl-208	3400000

+D indicates progenies included in the calculation for the parent radionuclide

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